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## SHORTER ARTICLES AND CORRESPONDENCE

### THE AGE OF SPEED SIRES

IN the May number of the *NATURALIST*, Mr. Redfield makes reply to the criticism of his theory which I made in the issue of January of last year.

Recalling the interest evidenced by biologists when Mr. Redfield's theory appeared some years ago, and considering that no one else has criticized his figures, I assume the question to still be a proper one for discussion.

Mr. Redfield's conception of acquired dynamic development and the data he presented to show its inheritance, strongly suggests the direct transmission of effects of use of the organs.

It is true that more than a majority of successful breeders of trotting horses believe the results of use to be transmitted. A settlement of the question is of no direct interest to horse breeding interests. A change of opinion would not change their practise. Selection and environment are the fundamental factors upon which their work is based. It is immaterial whether they consider one or the other to be of greatest moment; both are imperative. Mr. Redfield would say that the effect of the environment is transmitted. Selectionists would say that the racing test as a feature of environment is an indispensable aid to selection of good individuals and is the only real proof of individual merit.

The fact that a few breeders who regard training as an aid to selection have been as successful as any of the breeders who think otherwise, goes to show that in the breeding of trotters, practises of best breeders vary but little. They differ in their explanation of how the two factors exert their influence upon the results. This lack of agreement, while of no immediate import in practical breeding, because it bears upon a principle involved is of primary interest in the scientific study of heredity.

In my contribution last year, I criticized Mr. Redfield's figures only as they related to the age of sires. He assumes dynamic development to be proportionate to the amount of racing and to the age.

Mr. Redfield's own words will explain the evidence from which he argues for the value of age:

I said that I took one thousand registered stallions, alphabetically, from the "Index Digest" of the "Register," and calculated the ages of their sires at the time when these registered stallions were foaled. From these I determined that the average time between generations in the male line was 10.43 years, which would give the average age of sires as 9.43 years at the time of service. I then said that, making all reasonable allowances for errors, the average time between generations in the male line might be set down as between 10 and 11 years, and that this period might be used as a standard in testing the age part of the theory. So far no one claims to have tested the accuracy of my calculation; no one claims that the figures I gave were wrong; and no one has said that these figures can not properly be used as a standard; yet if I am to be controverted, one of the first things to be done is to dispute the accuracy of my standard.

I then took the entire list of 2.10 trotters as an appropriate class of animals to be used in testing the inheritance of dynamic development, and I calculated the ages of their male progenitors for four generations. The number of animals involved was over five thousand and I gave the average time between generations in the male line for the production of 2.10 trotters as being approximately 14.00 years. This is an average of nearly 40 per cent. over the standard average determined from the "Register," and my explanation of this remarkable difference was that it indicated the inheritance of acquired dynamic development. So far no one has disputed the accuracy of my computation and no one has attempted to give any other explanation of such an unusual divergence from the natural order of things.

My objection was to comparing the average age of immediate sires in one case with that of all sires in four generations in the other case. I showed that when we take only immediate sires in both cases, it is shown that the average age of the sires of 2.10 horses is practically the same as that of average horses as given by Mr. Redfield.

He now shows that in the case of the 2.10 trotters, while their sires were of an average age of 10.4 years, their grandsires averaged 12.5 years, the great-grandsires 13.5 years, the great-great-grandsires 14.5 years; the stallions appearing in the next two lines at the ages of 15 and 15.98 years.

The evident conclusion from this statement is that our best horses have come from an increasing popularity of *younger* sires.

But this statement regarding the age of sires in various lines

is used in contrast with conditions in average horses and the actual figures for the ages of progenitors of average horses are not given to us, but assumed to be much lower. This assumption is erroneous.

It would be very interesting to have the average ages of grandsires, great-grandsires, etc., of the first thousand horses named in the "Index Digest" and used by Mr. Redfield to represent average horses.

I have considered it fairer, however, to use a group, though smaller, more nearly contemporaneous with the 242 horses of 2.10 records used in my previous study. It would be desirable to have a figure based upon the study of the 2.10 list as it stood at the end of 1909, but a comparison of the two groups here used is, I think, a fair one. The group used to represent average horses and as having been bred at about the same time as the 242<sup>1</sup> horses with 2.10 records consists of the first 242 horses registered in Volume 15 of the "Register."

The following tabulation will show that the two groups were contemporaneous:

	Foaled before 1880.	Foaled 1880-1885.	Foaled 1886-1890.	Foaled 1891-1895.	Foaled 1896-1900.
2.10 horses	2	12	40	95	81
Average horses from Vol. 15	2	3	14	116	107

The average age of stallions appearing in each line of the pedigree of the above is as follows:

AVERAGE AGE OF				
	Sires.	Grandsires.	Great Grandsires.	Great Great Grandsires.
2.10 horses	9.4 <sup>2</sup>	11.5 <sup>2</sup>	12.5 <sup>2</sup>	13.5 <sup>2</sup>
Average horses from Vol. 15	8.28	10.65	11.64	12.78

I am still of the opinion that an impartial study of the figures does not show that age is, of itself, any factor in the inheritance of speed.

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<sup>1</sup> Vol. 22 of the "Year Book" gives 279 fast (2.10) horses, but it is possible to determine the age of the sires of only 242 of these.

<sup>2</sup> One year less than given by Mr. Redfield to show the age of stallions at the time the foals were sired.